[Proc. Roy. Soc. Victoria, 31 (N.S.), Part I, 1918].

Art. V.—*Ostracoda from the Upper Cambrian Limestone of South Australia.*

By FREDERICK CHAPMAN, A.L.S., &c.
(Palaeontologist, National Museum, Melbourne).

(With Plate IX.).

[Read May 9th, 1918].

Sources of the Collection.

In January, 1903, Mr. George Sweet, F.G.S., of Brunswick, kindly placed a series of leperditioid fossils in my hands for description. The specimens, numbering about twenty-two, were collected by Mr. Sweet from the Upper Cambrian *Archaeocyathina* Limestone at Curramulka, South Australia.

Subsequently, in January, 1906, Mr. Walter Howchin, F.G.S., of the Adelaide University, was good enough to send me a tablet of similar ostracodal remains from the same locality; and quite recently he supplemented these with two others. These mounted specimens from the Adelaide Museum presumably included the two forms mentioned by Prof. Ralph Tate in his paper, "On the Cambrian Rocks at Curramulka."[1] and to which reference will be found in the descriptive part of this paper.

Generic Affinities of the Species.

After a rather prolonged study of these difficult forms I have concluded that they represent both *Leperditia* and *Isochilina*. The former genus is more usually met with in Ordovician and Silurian strata, and occasionally in Devonian and Carboniferous beds, but is not unknown from the Upper Cambrian notwithstanding that E. O. Ulrich in Eastman-Zittel[2] gives the range "Ordovician to Carboniferous." That the genus *Leperditia* was already established in Upper Cambrian times is seen from the following references:—

In the Calciferous Sandstone of Grande Isle, Grenville and Hawkesbury, Canada, which is equivalent to the Tremadoc Slate of the Upper Cambrian, *Leperditia canadensis* occurs, together with *Beyrichia logani* and *Isochilina ottawa*. *Leperditia anna* is found in similar beds in St. Ann, Canada.[3]

1 Trans. Roy. Soc. South Austr., vol. xv., 1892, p. 187.
2 Text-book of Palaeontology, vol. i., 2nd ed., 1913, p. 737.
3 See Rupert Jones. Ann. Mag. Nat. Hist., ser. 3, vol. i., 1858, pp. 244, 247.

From the Lower Cambrian of the State of New York, Walcott[1] obtained a leperditioid form (*Leperditia dermatoides*), having a punctate surface, which, as Walcott suggested, might represent a new genus. Subsequently, *L.dermatoides* was made the type of the genus *Indiana* by G. F. Matthew.[2] It was to this species that comparison of a South Australian form from Curramulka was made by Prof. Tate,[3] but which is probably referable to a species of *Isochilina*.

The *Leperditia troyensis* of Ford,[4] from the Middle Cambrian of New York State, is now referred to the phyllocarid genus *Aristozoe*, by C. D. Walcott.[5]

It is a striking fact with regard to two *Leperditiae* now recorded from South Australia, that they represent southern hemisphere forms of two distinct types of the genus, both of which are found in Canada, namely, a short suboval form, like *L.anna*, and another, subrhomboidal and oblique, resembling the species described as *L.canadensis*.

The form here referred to *Isochilina*, was relegated to that genus only after some consideration. However, the apparently equal valves and grooved and flattened edges are more in keeping with the characters of this genus rather than with other related generic forms, although it may have later to be given a new genus name. A very useful list of the known *Isochilinae* is given by Prof. Rupert Jones in the Geological Magazine.[6]

DESCRIPTION OF SPECIES.

Ostracoda.

Fam. Leperditiidae.

Genus Leperditia, Rouault.

Leperditia tatei, sp. nov. (Plate IX., Figs. 1*a*, *b*, 2*a*, *b*, 3*a*, *b*).

Description.—Carapace seen from the side nearly semicircular to suboval; height about two-thirds the length. Dorsal line straight or slightly curved; both extremities bluntly rounded, the anterior forming almost a right angle, bearing a flanged margin. Median

1 U.S. Geol. Surv., 10th Ann. Rep. (1888-9), 1890, p. 626, pl. lxxx., figs. 1, 1*a*.
2 Canadian Record of Science, vol. viii., 1902, p. 460.
3 Trans. R. Soc. S. Austr., vol. xv., 1892, p. 187.
4 Amer. Journ. Sci., ser. 3, vol. vi., 1373, p. 138.
5 U.S. Geol. Surv., Bull. No. 30, Second Contr. Camb. Faunas N. Amer., p. 146. pl. xvi., fig. 5.
6 Geol. Mag., Dec. 1 (n.s.), vol. x., July, 1903, pp. 303-304.

surface strongly convex; general surface punctate. There is an ocular spot in some specimens situated in the anterior third. Ventral view shows the characteristic infolded margin which in the left valve is overlapped by the right. The end view shows a sub-oval outline.

Dimensions.—Holotype,[1] length, 3 mm.; height, 2 mm.; thickness of carapace, 1 mm. Length of a paratype (Tate coll.), 4.4. mm. Length of another paratype (Sweet coll.), 2.4 mm.

Observations. —From the outline of the above fossil one is reminded of the Cambrian genus *Aluta*, especially *A.enyo*, Walcott sp.[2] The carapace in the South Australian species, however, is not continuously rimmed by a flange, and is not so uniformly compressed. This species is of the general form of *Leperditia anna*, Jones,[3] from the Calciferous Sandrock (Upper Cambrian) of St. Ann's, at the confluence of the Ottawa and St. Lawrence, Canada. L.tatei agrees in outline, position of the ocular spot, and the punctated shell-surface; *L.anna* differs from *L.tatei* in having a rounded, not margined, anterior, a more depressed and a larger carapace, the length of *L.anna* being 5 mm.

Leperditia tatei is evidently a very abundant form in the Curramulka Limestone, for fragments of the carapace are found scattered through it. In his paper on "The Cambrian Fossils of South Australia," Prof. Ralph Tate says[4] that the genus *Leperditia* "is indicated by the occurrence of two species, one, which has much resemblance to *L.dermatoides*, Walcott, is oval in outline, and about 3 mm. in the long diameter; the other has a circular outline with a diameter of about 1 mm. Both are moderately common, but I have not secured any example of either sufficiently free from matrix to permit of a critical comparison with figured species, or to figure with a sufficient degree of accuracy." The specimens referred to by Tate having been kind'y lent me by Mr. Walter Howchin, I am in a position to say that the fossil mentioned as having a long diameter of 1 mm., is evidently that now figured as *Leperditia tatei* (paratype, pl. IX., fig. 2); whilst the larger specimen referred to as having an oval outline with much resemblance to *L.dermatoides*, Walcott is evidently a species of *Isochilina*.

Occurrence.—Grey Limestone. Upper Cambrian, Curramulka, S. Australia. Tate and Sweet colls.

---

1 Pres. to National Museum coll.

2 *Bradoria enyo*, Walcott, Proc. U.S. Nat. Mus., vol. xxix., 1905, p. 99. *Aluta enyo*, Walcott sp., Research in China, vol. iii., 1913, p. 225, pl. xxiii., fig. 11.

3 Ann. Mag. Nat. Hist., ser. 3, vol. i., 1858, p. 247, pl. ix., fig. 18.

4 Trans. R. Soc. S. Austr., vol. xv, 1892, p. 187.

Leperditia capsella, sp. nov. (Plate IX., Figs. 4*a*, *b*).

Description.—Carapace seen from the side, broadly ovate, oblique. Hinge-line straight and thickened; about two-thirds the length of the carapace, anterior border almost at right angles to the back, with a slight re-entrant curve, obliquely rounded to the widely curved ventral edge; posterior extremity subangularly rounded and obliquely produced. Sides of carapace compressed, especially anteriorly and dorsally; highest part in the posterior third. Surface of valves finely punctate and crossed with fine linear markings parallel with the dorsal border. Muscle spot sub-central and slightly depressed, from which radiate fine striae. There is a well marked sub-median pit a litle below the thickened hinge-line. End view, acuminately ovate.

Dimensions.—Holotype; length, 3.9 mm.; greatest height, 3.05 mm.; thickness of carapace, 2 mm.

Observations.—The present species, *Leperditia capsella*, has many points of resemblance to *L.canadensis*, Rupert Jones,[1] another of the species found in the Calciferous Sandstone of Canada, and presumably of Upper Cambrian age. The more compressed form of the carapace, higher valves and stronger re-entrant curve of the anterior border, serving to distinguish our species, the outline of which reminds one of a seed-capsule of the common English weed, the Shepherd's Purse (*Capsella bursa-pastoris*).

Occurrence.—One specimen, left valve (Holotype), from the Sweet collection;[2] also a right valve, Tate collection, S. Australian Museum, lent by Mr. W. Howchin. From the grey limestone of Curramulka, S. Australia.

Genus Isochilina, Jones.

Isochilina sweeti, sp. nov. (Plate IX., Figs. 5*a*, *b*).

Description.—Carapace large, solid, strongly convex, highest about the centre. Seen from the side the valves are sub-circular, slightly oblique. Hinge-line straight, of moderate length, rather more than half the long diameter. Anterior border nearly at right angles to the hinge-line, rounded obliquely below to meet the widely-curved ventral border. Posterior extremity produced and well-rounded. Edges of valve bordered by a fairly wide flange, rounded

1 Ann. Mag. Nat. Hist., ser. 3, vol. i., 1858, p. 244, pl. ix., figs. 11-15.
2 Presented to the National Museum.

on the inner side and grooved on the outer. Valves equal. Surface smooth, with a muscle spot situated near the dorsal region of the anterior third, and a shallow depression (better seen in other unfigured specimens), near the dorsal area and slightly anterior to the middle.

Dimensions.—Length, 7.2 mm.; height, 6 mm.; thickness of carapace, 3.2 mm.

Observations.—Only one other species of this genus has been hitherto recorded from Cambrian beds, viz., *Isochilina ottawa*, Jones[1], which occurs in the Calciferous Sandstone of Canada, but which is also found in the Chazy Limestone (Arenig age). *I. ottawa* is only half the diameter of the present species, and is more oblong in shape.

From its contour one might at first be inclined to refer this species to *Aristozoe*, Barrande, but that genus is more compressed and pod-shaped, with nodular prominences in the antero-dorsal region. Moreover, it is less thickly calcified, as would be expected in a phyllocarid crustacean.

Occurrence.—This large and conspicuous species seems fairly common in the Curramulka Limestone. All the specimens examined were from the Sweet collection, with the exception of a doubtful, partially buried carapace from the Tate collection, S. Australian Museum (lent by Mr. W. Howchin, F.G.S.).

EXPLANATION OF PLATE IX.

Fig. 1.—*Leperditia tatei*, sp. nov.; *a*, right valve seen from the side; *b*, profile. Holotype. Sweet coll. × 10.

Fig. 2.—*L. tatei*, sp. nov.; *a*, left valve seen from the side; *b*, ventral edge view. Paratype. Tate coll. × 10.

Fig. 3.—*L. tatei*, sp. nov.; *a*, left valve of a narrower specimen; *b*, profile. Paratype. Sweet coll. × 5.

Fig. 4.—*Leperditia capsella*, sp. nov.; *a*, left valve seen from the side; *b*, profile. Holotype. Sweet coll. × 10.

Fig. 5.—*Isochilina sweeti*, sp. nov., *a*, right valve seen from the side; *b*, profile. Holotype. Sweet coll. × 5.

All the specimens are from the Upper Cambrian Limestone of Curramulka, South Australia.

---

1 Ann. Mag. Nat. Hist., ser. 3, vol. i., 1858, p. 248, pl. x., figs. 1*a-c*. Geol. Surv. Can., Organic Remains, 1858, p. 97, pl. xi., figs. 14*a-c*. Ann. Mag. Nat. Hist., ser. 5, vol. xiv., 1884, p. 345.